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ELECTRICAL ENGINEERING UNITS AND CONSTANTS

Units and Symbols			
Quantity	Symbol	Unit	Identical Unit
current	<i>I</i>	ampere	A
charge	<i>Q</i>	coulomb	C
voltage, potential	<i>V</i>	volt	V
energy, work	<i>W</i>	joule	J
power	<i>P</i>	watt	W
resistance	<i>R</i>	ohm	Ω
conductance	<i>G</i>	siemens	S
resistivity	ρ	ohm-metre	Ω · m
conductivity	σ	siemens per metre	S/m
reactance	<i>X</i>	ohm	Ω
susceptance	<i>B</i>	siemens	S
impedance	<i>Z</i>	ohm	Ω
admittance	<i>Y</i>	siemens	S
capacitance	<i>C</i>	farad	F
inductance	<i>L</i>	henry	H
electric flux density	<i>D</i>	coulomb per square metre	C/m ²
electric field strength	<i>E</i>	volt per metre	V/m
permittivity	ϵ	farad per metre	F/m
relative permittivity	ϵ_r	(pure number)	
magnetic flux	Φ	weber	Wb
magnetic flux density	<i>B</i>	tesla	T
magnetic field strength	<i>H</i>	ampere per metre	A/m
permeability	μ	henry per metre	H/m
relative permeability	μ_r	(pure number)	
magnetomotive force	\mathcal{F}	ampere	A
reluctance	\mathcal{R}	ampere per weber	A/Wb
permeance	\mathcal{P}	weber per ampere	Wb/A
length	<i>l</i>	metre	m
mass	<i>m</i>	kilogram	kg
time	<i>t</i>	second	s
force	<i>F</i>	newton	N
pressure	<i>p</i>	pascal	Pa
frequency	<i>f</i>	hertz	Hz
angular frequency	ω	radian per second	rad/s
plane angle	θ	radian	rad
solid angle	Ω	steradian	sr

(over)

Units and Symbols - Continued

Quantity	Symbol	Unit	Identical Unit
thermodynamic temperature	<i>T</i>	kelvin	K
Celsius temperature	<i>t</i>	degree Celsius	°C
amount of substance	<i>n</i>	mole	mol
luminous intensity	<i>I</i>	candela	cd

Physical Constants¹

Constant	Symbol	Rounded Value
elementary charge	<i>e</i>	1.6022×10^{-19} C
speed of light in vacuum	<i>c</i>	2.9979×10^8 m/s
electric constant	ϵ_0	8.8542×10^{-12} F/m
magnetic constant	μ_0	$4\pi \times 10^{-7}$ H/m†
Planck constant	<i>h</i>	6.626×10^{-34} J · s
Boltzmann constant	<i>k</i>	1.381×10^{-23} J/K
Faraday constant	<i>F</i>	9.649×10^4 C/mol
proton gyromagnetic ratio	γ_p	2.6752×10^8 rad/(s · T)
standard acceleration of free fall	g_n	$9.806 65$ m/s ² †
standard atmosphere	atm	101 325 Pa† († defined value)

¹ See General Physical Constants, NBS Special Publication 344, March 1971 (Pocket Card), Price 10¢; \$6.25 per 100.

Decimal Prefixes

Factor	Prefix	Symbol	Factor	Prefix	Symbol
10 ¹²	tera	T	10 ⁻²	centi	c
10 ⁹	giga	G	10 ⁻³	milli	m
10 ⁶	mega	M	10 ⁻⁶	micro	μ
10 ³	kilo	k	10 ⁻⁹	nano	n
10 ²	hecto	h	10 ⁻¹²	pico	p
10 ¹	deka	da	10 ⁻¹⁵	femto	f
10 ⁻¹	deci	d	10 ⁻¹⁸	atto	a

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